

WHAT IS CLAIMED IS

1. A method of detecting protrudent matters adhered on an outside of a connected work member of a plurality of metallic materials, comprising:

5 a photographing process for photographing the connected work member by a photographing instrument to generate a photographic image;

a confirmation process of making an outside outline of the connected work member (also called as "outline of the work to be detected" hereafter) in the photographic image correspond to a range including a non-allowable range not allowing existence of the protrudent adhered matters and confirming presence or absence of the existence of the outline of the work to be detected in the non-allowable range; and

15 a judging process of judging that the protrudent adhered matters exist on the outside of the connected work member when the existence of the outline of the work to be detected in the non-allowable range is confirmed in the confirmation process.

20 2. The method of detecting the protrudent adhered matters as set forth in claim 1, comprising;

making, in said confirmation process, correspondence between the outline of the work to be detected and a range including the non-allowable range in said photographic image, and confirming, in the corresponding photographic image,

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presence or absence of the existence of the outline of the work  
to be detected in the non-allowable range.

3. The method of detecting the protrudent adhered  
5 matters as set forth in claim 1, comprising:

in advance deciding the non-allowable range on the basis  
of the outside outline (also called as "outline of the reference  
work" hereafter ) of a reference work material to be a reference  
of the connected work member.

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4. The method of detecting the protrudent adhered  
matters as set forth in claim 3, comprising:

previously setting, in the confirmation process, a  
detecting line as a boundary between the non-allowable range  
15 and an allowable range for allowing the existence of the outline  
of the reference work neighboring the non-allowable range on  
the basis of the outline of the reference work, making the  
correspondence between the detecting line and the outline of  
the work to be detected in the photographic image, and confirming  
20 whether or not the outline of the work to be detected exists  
on the detecting line.

5. The method of detecting the protrudent adhered  
matters as set forth in claim 4, comprising:

25 in the confirmation process, making correspondence

between the outline of the work to be detected and the detecting line in the photographic image, and confirming, in the photographic image, whether or not the outline of the work to be detected exists on the detecting line.

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6. The method of detecting the protrudent adhered matters as set forth in claim 4 or 5, comprising:

setting a reference point to be a positioning reference of the detecting line corresponding to the outline of the work to be detected in a prescribed position on the outline of the work to be detected, and positioning the detecting line to the outline of the work to be detected on the basis of the reference point.

15 7. The method of detecting the protrudent adhered matters as set forth in claim 4 or 5, comprising:

determining reference points per members in the plurality of metallic materials connected as elements of the connected work members, and positioning the detecting line per each of the metallic materials on the basis of the reference points per members.

8. The method of detecting the protrudent adhered matters as set forth in claim 7, wherein

25 said plurality of metallic materials include two metallic

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members of different diameters, and in regard to at least one of these two metallic materials, a position of changing the diameter in the outline of the work to be detected is determined as a reference point per member.

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9. The method of detecting the protrudent adhered matters as set forth in any one of claims 4 to 8, wherein the connected work member is formed to be axial, and when projecting toward an imaginary plan in parallel to

10 a central axial line of the connected work member, the outline of the work to be detected in an orthogonal image is linearly symmetrical with respect to the central axial line (also called as "image central axial line" hereafter) of the connected work member on the orthogonal image.

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10. The method of detecting the protrudent adhered matters as set forth in claim 9, wherein

in case one side concerning the image central axial line of the outline of the work to be detected of the linear symmetry

20 is a first side and the other side is a second side, mutually symmetrical reference points are respectively set in the first side and the second side, and an ordering point (also called as "the ordering point of the first side detecting line" hereafter) is determined for ordering a position of the first

25 side on the basis of a reference point (also called as "the

first side reference point" hereafter) of the first side, and  
the positional relation between the first side reference  
point and the ordering point of the first side detecting line,  
as well as the positional relation between the second reference  
5 point and the ordering point (also called as "the ordering point  
of the second side detecting line" hereafter) for prescribing  
the detecting line in the second side based on the second side  
reference point, are automatically settled to be symmetrical  
with respect to the central axial line on the basis of the first  
10 side reference point, the second side reference point and the  
ordering point of the first side detecting line.

11. The method of detecting the protrudent adhered  
matters as set forth in claim 9 or 10, wherein  
15 the photographing process rotates the connected work  
member per each of fixed angles around the rotation axial line  
of the central axial line, creates the photographic image of  
the connected work members in the respective angles, and performs  
the confirmation process in the respectively created  
20 photographic images.

12. The method of detecting the protrudent adhered  
matters as set forth in any one of claims 1 to 11, wherein,  
in the outline of the reference work, a height  $H_1$  (also called  
25 as "the allowable height  $H_1$ " hereafter) allowing the protrudent

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adhered matters to exist is in advance decided, and in case L is the distance between the outline of the reference work and the detecting line, the relation between the allowable height H1 and the distance L is decided to satisfy  $0.3 \leq L/H1 \leq 0.9$ .

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13. The method of detecting the protrudent adhered matters as set forth in any one of claims 1 to 12, wherein the connected work member is made by connecting the plurality of metallic materials by a laser weld or a resistance weld.

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14. A method of making spark plugs, comprising a process of detecting the protrudent adhered matters by use of the method of detecting the protrudent adhered matters as set forth in any one of claims 1 to 13, and

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a post-treating process for carrying out the post-treatment on the basis of detected results obtained by the detecting process of the protrudent adhered matters.